

REMARKS

This case has been carefully reviewed in light of the Office Action dated 26 March 2002, wherein claims 9-15, 17-18, and 20-25 stand withdrawn pursuant to a requirement for restriction; claims 1-6 and 16 were rejected under 35 USC 103(a) on Gorowitz et al., US Patent No. 5,757,072 (hereinafter Gorowitz) in view of Noddin, US Patent No. 5,731,047; and claims 7-8 and 19 were rejected under 35 USC 103(a) on Gorowitz and Noddin and further in view of Saia et al., US Patent No. 6,150,719 (hereinafter Saia). Claims 5, 9-15, 17-18, and 20-25 have been canceled, and claims 1, 7, and 16 have been amended.

Claims 1-4, 6-8, 16, and 19 remain pending in this application. Reconsideration in light of the above amendments and the following remarks is respectfully requested.

Election/Restrictions

By telephone on 10/22/01, a restriction requirement was issued identifying: Group I. Claims 1-19, drawn to a method for making semiconductor device classified in class 438, subclass 118; and Group II. Claims 20-25, drawn to a semiconductor device, classified in class 257, subclass 758. Applicants elected Group 1 without traverse.

In Paper No. 3, the Examiner required an affirmation of the election and further stated that the remaining claims 1-19 were directed to patentably distinct species identified as: First embodiment: figs. 1-7; Second embodiment: figs. 8-13; and Third embodiment: figs. 14-17. The Examiner further stated that there is no generic claim and that Applicants must identify the species that is elected and a listing of all claims readable thereon.

In response, Applicants affirmed the election of Group I, claims 1-19, and elected to prosecute the species of the first embodiment for which Applicants listed the claims as claims 1-8, 16, and 19. Applicants additionally traversed Paper No. 3 statement that there is no generic claim and respectfully submit that claim 1 is generic to all three embodiments and that claim 16 is generic to the first and second embodiments.

In Paper No. 5, the Office Action acknowledged the election of claims 1-8 and 19 and continued to state that there is no generic claim.

Although Applicants continue to traverse the statement that there is no generic claim, to expedite prosecution, Applicants have canceled claims 9-15, 17-18, and 20-25 pursuant to the requirements for restriction. Applicants are filing a divisional application including claims 9 and 17 each rewritten in independent form to obtain specific coverage of the Second embodiment.

Claims 1-6 and 16

Applicants respectfully traverse the rejection of claims 1-6 and 16 under 35 USC 103(a) over Gorowitz in view of Noddin. To expedite prosecution, however, Applicants have canceled claim 5 and moved the claim 5 recitation into claims 1 and 16. Because claim 1 has the scope of previous claim 5, Applicants respectfully submit that no new search is required.

Applicants respectfully submit that the applied references do not teach, suggest, or disclose (either individually or in combination) the claim 1 and 16 recitations of:

1 (amended). A method for packaging a microelectromechanical system (MEMS) device comprising:
using a partially-cured adhesive to attach a release sheet to a MEMS package flexible layer;
providing a cavity having a smooth surface perimeter and extending through the release sheet and at least partially through the MEMS package flexible layer;
removing the release sheet; and
attaching the MEMS device to the MEMS package flexible layer with a MEMS structure of the MEMS device being positioned within the cavity.

16 (amended). A method for packaging a microelectromechanical system (MEMS) device comprising:
coating an MEMS package flexible layer with an adhesive;
partially curing the adhesive;
using the adhesive to attach a release sheet to the MEMS package flexible layer;
providing a cavity having a smooth surface perimeter and extending through the release sheet, the adhesive, and at least partially through the MEMS package flexible layer;
removing the release sheet;
using the adhesive to attach the MEMS device to the MEMS package flexible layer with a MEMS structure of the MEMS device being positioned within the cavity;
providing MEMS vias through the MEMS package flexible layer extending to connection pads of the MEMS device; and
applying a MEMS pattern of electrical conductors on the MEMS package flexible layer and extending through the MEMS vias to the connection pads.

Applicants respectfully traverse the Office Action statement on page 4 that "it would have been obvious that the Gorowitz et al. cavity having a smooth surfaced perimeter," and submit that the Office Action has provided no supporting reference and no discussion relating to the motivation of one of ordinary skill in the art at the time of the invention to make this modification.

As stated in paragraph 16, lines 3-11, of Applicants' Specification:

"Smooth-surfaced perimeter" is meant to encompass any perimeter without sharp edges (such as 90 degree corners in square or rectangular perimeters). Examples of smooth-surfaced perimeters include ovals, circles, rounded rectangles as shown in FIG. 3, or other straight line perimeters having rounded corners or corners of greater than 120 degrees, for example. Smooth-surfaced perimeters are useful for evenly distributing any excess adhesive that is close to the surface of MEMS structure 22. Harsh-surfaced perimeters such as 90 degree corners create the potential for localized stress and excess flow of adhesive (and thus the potential for interference with MEMS structure 22).

Noddin does not overcome the above absence of the teaching, suggestion, or disclosure of a smooth surface perimeter in Gorowitz.

Accordingly, Applicants respectfully submit that claim 1, claims 2-4 and 6 which depend therefrom, and claim 16 define allowable subject matter over the applied art.

Claims 7-8 and 19

Applicants respectfully traverse the rejection of claims 7-8 and 19 under 35 USC 103(a) over Gorowitz and Noddin and further in view of Saia. Claim 7 has been rewritten in independent form without

changing its scope, so Applicants respectfully submit that no new search is required. Unamended claim 19 depends from above-discussed claim 16.

Applicants respectfully submit that the applied references do not teach, suggest, or disclose (either individually or in combination) the claim 7 and 19 recitations of:

7 (amended). A method for packaging a microelectromechanical system (MEMS) device comprising:
using a partially-cured adhesive to attach a release sheet to a MEMS package flexible layer;
providing a cavity extending through the release sheet and partially through the MEMS package flexible layer;
providing a protective coating in the cavity;
then removing the release sheet; and
attaching the MEMS device to the MEMS package flexible layer with a MEMS structure of the MEMS device being positioned within the cavity.

19. The method of claim 16 wherein providing the cavity comprises providing a cavity extending partially through the MEMS package flexible layer and further comprising, prior to removing the release sheet, providing a hermetic coating in the cavity.

Applicants respectfully traverse the Office Action statement on page 4 that "it would have been obvious ... to modify the device of Gorowitz et al. with a protective coating for the polymer film, as shown by Saia et al."

In Saia, the coating appears to be an external coating over a polymer film structure for protecting a circuit chip. The office action has provided no indication of the motivation for one of ordinary skill in the art at the time of the invention to practice a method including providing a protective or hermetic coating in a cavity [that is, an interior surface with respect to the flexible layer] prior to removing a release sheet.

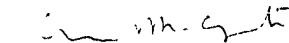
Accordingly, Applicants respectfully submit that claim 7, claim 8 which depends therefrom, and claim 19 define allowable subject matter over the applied art.

Summary

In view of the foregoing, Applicants respectfully submit that the application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are respectfully requested.

Should the Examiner believe that anything further is needed to place the application in even better condition for allowance, the Examiner is requested to contact Applicants' undersigned representative at the telephone number below.

Respectfully submitted,



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Version with markings to show changes made

Claim 1 (amended). A method for packaging a microelectromechanical system (MEMS) device comprising:

- using a partially-cured adhesive to attach a release sheet to a MEMS package flexible layer;
- providing a cavity having a smooth surface perimeter and extending through the release sheet and at least partially through the MEMS package flexible layer;
- removing the release sheet; and
- attaching the MEMS device to the MEMS package flexible layer with a MEMS structure of the MEMS device being positioned within the cavity.

Claim 7 (amended). [The method of claim 1 wherein] A method for packaging a microelectromechanical system (MEMS) device comprising:

- using a partially-cured adhesive to attach a release sheet to a MEMS package flexible layer;
- [providing the cavity comprises] providing a cavity extending through the release sheet and partially through the MEMS package flexible layer;
- [and further comprising, prior to removing the release sheet,] providing a protective coating in the cavity;
- then removing the release sheet; and
- attaching the MEMS device to the MEMS package flexible layer with a MEMS structure of the MEMS device being positioned within the cavity.

Claim 16 (amended). A method for packaging a microelectromechanical system (MEMS) device comprising:

- coating an MEMS package flexible layer with an adhesive;
- partially curing the adhesive;
- using the adhesive to attach a release sheet to the MEMS package flexible layer;
- providing a cavity having a smooth surface perimeter and extending through the release sheet, the adhesive, and at least partially through the MEMS package flexible layer;
- removing the release sheet;
- using the adhesive to attach the MEMS device to the MEMS package flexible layer with a MEMS structure of the MEMS device being positioned within the cavity;
- providing MEMS vias through the MEMS package flexible layer extending to connection pads of the MEMS device; and
- applying a MEMS pattern of electrical conductors on the MEMS package flexible layer and extending through the MEMS vias to the connection pads.